Bridging nonliving and living matter,
Los Alamos and Santa Fe, NM, USA, September 9-11, 2003

Organized by
Steen Rasmussen, Los Alamos
Liaohai Chen, Argonne
David Deamer, UC Santa Cruz
David Krakauer, Santa Fe
Norman Packard, Prediction Company
Peter Stadler U of Leipzig.

Sponsored by
Los Alamos Center for Space Science and Exploration (CSSE)
and Santa Fe Institute (SFI)

The goal of this meeting is to identify key open problems and the most promising future directions for assembling protocells as well as for their applications in living technology.

Tuesday, September 9, 2003 (@LANL, Oppenheimer Study Center)
Open for the broader LANL and SFI communities
Systems approaches to protocells

8:30 – 9:00 Continental breakfast at LANL in Oppenheimer Study Center.
(~30 min talks followed by ~15 min questions, 45 min total)

9:00 – 9:15 Welcome to Los Alamos and Introduction to the Workshop
9:15 – 10:00 **Steen Rasmussen**, Los Alamos, *"Minimal thermodynamic protocell design"*
9:00 – 10:45 **David Deamer**, UC Santa Cruz *"Vesicle self-assembly and encapsulated polymer synthesis"*
10:45 – 11:00 Break
11;00 – 11:45 **Takashi Ikegami**, U of Tokyo, "*Abstract simulations of protocells"*
11:45 – 12:30 **John McCaskill**, Fraunhofer, *"Controlling space for simple life"*
12:30 – 1:30 Lunch
1:30 – 2:15 **Peter Stadler**, U of Leipzig, "*Replicator network dynamics"*
2:15 – 3;00 **Martin M. Hanczyc**, Harvard, "*Formation and replication of protocellular compartments"*
3:00 – 3:15 Break
3:15 – 4:00 **Andy Pohorille**, NASA Ames, *"Nongenomic early organisms"*
4:00 – 4:45 **Hamilton Smith**, IBEA, "*A top-down approach to defining a minimal cell.*"

Bus pickup at Oppenheimer Study Center, 5:00 pm
Free evening in Santa Fe – no organized dinner plans.

Wednesday, September 10, 2003 (@SFI)
Only workshop participants
Technical and thematic issues for protocells

8:30 – 9:00 Continental breakfast at SFI

(~15 min presentation followed by ~30 min discussion, 45 min total)

9:00 – 9:45 **David Krakauer,** Santa Fe, Welcome to SFI & *"The protocellular context"*.

9:45 – 10:30 **Peter Nielsen**, U of Copenhagen, "*Protogenes"*

10:30 – 10:45 Break

10:45 – 11:30 **Eric Smith,** Santa Fe, and **Harold Morowitz,** George Mason U, *"Energetics and origins"*

11:30 – 12:15 **Norman Packard**, Prediction Company, "*Protocells and openended evolution"*

12:15 – 1:15 Lunch

1:15 – 2:00 **Kim Rasmussen**, Los Alamos, *"Charge transfer in DNA-like systems"*

2:00 – 2:45 **Liaohai Chen**, Argonne, *"Protocellular coupling of lipids, metabolism and genes"*

2:45 – 3:00 Break

3:00 – 3:45 **Yi Jiang**, Los Alamos, "*Molecular multiscale simulations"*

3:45 – 4:30 **Andrew Shreve**, Los Alamos, *"Useful functionalities of nanoaggregates"*

4:30 – 6:00 Continued discussions/free time.

Bus pickup at SFI at 4:30 in the event out of town participants need to go to Hotel. Bus pickup at Hotel Santa Fe at 6:00 followed by pick up at SFI at 6:15 for Rancho de Chimayo (conference dinner)

7:00 - 8:45 Dinner

8:45 - 9:15 Banquet talk: **Mark Bedau**, Reed, "*Ethical, religious, and environmental issues of living technology",* with following discussion.

10:00 Bus pickup and return to hotel in Santa Fe.

Thursday, September 11, 2003 (@SFI)
Only workshop participants
Technical and thematic issues for protocells continued and protocell road mapping

8:30 – 9:00 Continental breakfast at SFI

(~15 min presentation followed by ~30 min discussion, 45 min total)

9:00 - 9:45 **Shelly Copley**, U of Colorado, "Catalysis"

9:45 - 10:30 **Geoff West** & **Woody Woodruff** Los Alamos, *"Origo of universal bioscaling"*

10:30 - 10:45 Break

Road mapping: Where do we go from here?

10:45 – 12:30 First session of breakout groups

We will seek to balance the group composition in the best possible manner and the final group topics will be decided at the meeting with input from all participants.

Suggested group topics:

(1) Coupling between energetics, genes, and container
(2) Thermodynamic landscape of the transition between nonliving and living matter
(3) Replication yield issues and catalysis
(4) Realism and metaphors: building better connection between theory and experiments
(5) Protocell applications

12:30 - 1:30 Lunch

13:30 – 14:30 Second session of breakout group work

14:30 - 15:00 Break

15:00 – 16:30 Short plenum presentations from groups followed by open discussion of group findings in plenum.

16:30 Summary and Adjourn